QUALIFICATION FILE

Application Documentation: Version 1 /01 September, 2016

NSDA Reference
To be added by NSDA

CONTACT DETAILS OF SUBMITTING BODY

Name and address of submitting body:

C-DAC,ACTS

ACTS, Innovation Park, S. No. 34/B/1,

Panchvati, Pashan, Pune 411 008

Name and contact details of individual dealing with the submission

Name: Shri. Aditya Kumar Sinha

Position in the organisation: Joint Director

Tel number(s): 020-25503155

E-mail address: saditya@cdac.in

List of documents submitted in support of the Qualifications File

1. Qualification File
2. Course Content

QUALIFICATION FILE

SUMMARY

Qualification Title and Code:	Certificate Course Java Programming
Body/bodies which will award the qualification:	Centre for Development of Advanced Computing (C-DAC) organization of the Ministry of Electronics and Information Technology (MeitY), Ministry of Communications & Information Technology
Body which will accredit providers to offer the qualification:	C-DAC
Body/bodies which will be responsible for assessment:	C-DAC
Occupation(s) to which the qualification gives access:	Certificate Course Java Programming aims to groom the students to enable them to work on current technology scenarios as well as prepare them to keep pace with the changing face of technology and the requirements of the growing IT industry. Java is one of the most popular languages in the IT industry and many existing/upcoming technologies like android, hadoop, node-red, angular js uses java framework, which java assures demand for java professional in IT market in coming future. After the completion of the course, students can work as Software Developer or Programmer /IT Support staff/ Trainee / Tester / Technical Support and associated service sectors.
Proposed level of the qualification in the NSQF:	Level 7
Anticipated volume of training/learning required to complete the qualification:	320 hrs of classroom/lab learning
Entry requirements / recommendations:	Any Engineering /Science graduate with mathematics up to 10+2 level.
Progression from the qualification:	The course aims to groom the students to enable them to work on current technology scenarios as well as prepare them to keep pace with the changing face of technology and the requirements of the growing IT industry. The course curriculum has been designed keeping in view the emerging trends in advanced computing as well as contemporary and futuristic human resource requirements of the ICT industry.

QUALIFICATION FILE

	These candidates will be trained in software Engineering methodology, Project development and Management skills. They can start career as software developer, tester and Programmer, System Analyst after having relevant experience. Candidate can start from level 7 and lead to further levels.
Planned arrangements for RPL:	NA
International comparability where known:	There are many courses available on Java Programming globally but CDAC provides knowledge in Software Development, Database Technologies, Web Technologies, Core and Enterprise Java under single certification. Also the course emphasizes on fundamental concepts and practical training delivered by best of industrial experts. Implementation of learning can be evaluated under project.

Formal structure of the qualification:

Title of NOS/unit or other component (include any identification code used)	**Mandatory/ Optional**	**Estimated size (learning hours)**	**Level**
Database Technologies	M	30	7
Fundamentals of Computer & OOPs Concepts	M	26	7
Foundations of Web Technologies	M	32	7
Software Development Life Cycle	M	12	7
Core Java	M	50	7
Enterprise Java	M	70	7
Management Development Program	M	60	7
Project	M	40	7
Total		320	

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum or Qualification Pack.
Give details of the document here:

SECTION 1

QUALIFICATION FILE

ASSESSMENT

Body/Bodies which will carry out assessment:
C-DAC's Exam, Evaluation and Certification department will carry out assessment as per evaluation guideline finalized by Academic Council/ Academic Management Committee.

Will the assessment body be responsible for RPL assessment?

- Same will be finalised when the national RPL Policy will be finalised.
- Assessment is online through our e-Pariksha system or manually, depending on the strength of students.
- Issuance of qualification is centralized through C-DAC.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

Assessment is a necessary and essential part of conducting the Certificate Course in Java Programming, as it provides important feedback and inputs to both the institute as well as the student. The institute gets an idea about the relative performance of each student, which also serves as feedback about the design and conduct of the course. The student gets a clear picture of his academic standing, individually and in comparison to his fellow students.

- A separate evaluation process is to be conducted for every module of the course.
- The evaluation for each module must be completed as per guidelines given below. The mid-module /surprise test evaluation is mandatory and can be taken after discussion with the concerned faculty.
- Students are evaluated on a continuous and throughout the duration of the course to make a fair assessment of the skills acquired by them. To have a very uniform and fair assessment. The evaluation process is divided into two parts:
    - Continuous Assessment - CA (150 marks)
    - Course End Examination - CCE (150 marks)

Continuous Assessment :This is being done primarily by the respective faculty in the form of Lab tests, assignments, quizzes, submission of term reports, presentations etc. conducted (with the help of respective course co-coordinators) at regular intervals and as and when the portions of the subjects are completed. These are basically internal exams and local to the centre. This process is further categorized into two parts.

- Lab test
- Internal test : Assignment/Case Studies /quiz and other valuation methods like case study, viva, group discussion depending on the subject and the faculty

It is recommended to conduct Management Development Program and Organisational Behaviour sessions and also conduct surprise test for the development of soft skills, logical, analytical capabilities and managerial skills for the benefit of the students and also give assignments and conduct some surprise test related to Management Development Program and Organisational Behaviour.

The figures shown below indicate the weightage of each module in the final performance statement. The examination(s) for each module must be conducted for at least that number of marks. However, the centre may conduct evaluation for a higher number of marks, in which case the marks will be scaled down. For example, if the examination for the Operating Systems Concepts module is conducted for 100 marks, the marks earned by the student will be scaled down to out of 40.

A student must score a minimum of 40 percent marks in each component of the evaluation, and also

in the aggregate score, in order to successfully clear the module. If a student scores more than 40% on aggregate but has scored less than 40% in one component of the evaluation, he will not be declared as passed.

The weight age for each component will normally be:

Theory examination – (CCEE) 150 marks

Laboratory examination, Internal marks 150 marks

(Internal marks: Lab Assignment Evaluation, Surprise Tests, attendance, Viva, Seminars)

The question papers for the theory as well as the laboratory examinations at all the centres will be set by C-DAC, ACTS, Pune. The centres according to guidelines provided by, ACTS, Pune, will conduct the evaluation of the laboratory and assignments locally.

Minimum Pass marks:

The minimum marks to be obtained for declaring a student pass in any module is as follows:

For 40 mark QP : 16 marks

For 20 mark QP : 8 marks

For 60 mark QP : 24 marks

Assessment is through e-Pariksha system.

About e-Pariksha System:
e-Pariksha is a web based application for the automation of the examination process. The system provides a great control on exams from preparing question paper to scheduling exam and from monitoring exam to generate results.

e-Pariksha has a strong administration which provides complete system status in one glance.

It's Results & Reports generations functionality provides system details in all standard and required formats.

An image based, LAN based, secure, fault tolerant and scalable system through which examinations can be delivered "on demand" basis in selected examination centres spread across the country.

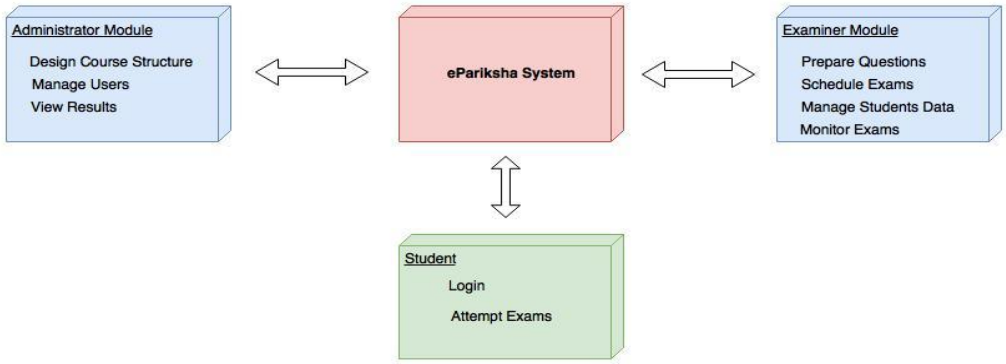
System Support:

- Decentralized mode of operation(LAN based)
- Question Paper approach
- Multi lingual and multi subject support
- Browser based

Components of the e-Pariksha System Includes:

- **Administration Module**- To design course structure, Manage users, view results.
- **ePariksha System** –Assessment of students through online system.
- **Examiner Module** -To manage the examination related activity and conduct- i.e Registration data and question paper uploading, conduct of examination, response generation
- **Student Login** –Allows students to login and attempt exams.

QUALIFICATION FILE



Salient Features:

- Exam Resume - Power Failure Handling
- Random Question Paper
- User friendly Interface
- Question Bank
- Instant Result
- Live Monitoring of Exams & Assignment
- Time bound exams
- Multilingual support
- Handheld devices Support
- Responsive Design

Feedback System: C-DAC**'s** Advanced Computing Training School (ACTS) offers various courses and training programs through its own training centres and its network of Affiliated Training Centres (ATC) spread across the country. Each year, thousands of students and professionals are trained at these centres.

The purpose of the system i.e. Online Feedback System (OFS) is to develop a web application for getting the online faculty feedback by the students studying at centres and also at the various Authorized Training Centres (ATC) affiliated to for different training programs offered by C-DAC ACTS.

This system is for conducting "The Student Survey" for quality assurance of education. Students, Faculties and administrators can all benefit from survey. This is helpful in the continual improvements in teaching programs, processes as well as infrastructure and thereby enhancing the students' learning experience at C-DAC ACTS.

The Online Feedback System make the student feedback procedure centralized for all C-DAC centres as well as various Authorized Training Centres (ATCs) located across the country through which headquarter manager can manage student feedback of faculties as well as infrastructure studying at different training centres with different reports for feedback analysis.

Please attach any documents giving further information about assessment and/or RPL.
Give details of the document(s) here:

QUALIFICATION FILE

ASSESSMENT EVIDENCE

There will be 150 questions to answer in 3 hours duration in Course End Exam as per the following distribution mentioned below.

Sr. No.	Module	Learning Outcome	Theory	Lab & IA	Total Marks
1	Fundamentals of Computer & OOPs Concepts	• Identify the principal components of a given computer system and basic Input/output Devices, Programming File System and how a computer system works. • Understand the basics of flowcharts and algorithms. • Demonstrate the basic elements of imperative programming: variables, flow control and functions • Effectively use industry standard tools for writing, testing, and running C code • Demonstrate File Handling. • Demonstrate various data types with enumeration data type.	15	15	30
2	Database Technologies	• Explain the concepts of relational database management system (RDBMS), particularly: ○ The importance of the data model, its building blocks, and how it relates to business rules. ○ How data is organized through the use of integrity rules and primary and foreign keys. ○ The importance of relational set operators, the data dictionary, and indexes. ○ Explain the fundamental differences between logical and physical database design. • Do the following for a simple prescribed business problem: ○ Demonstrate all Normal	15	15	30

		Forms, using Oracle 11g and need for de-normalization ○ Use of SQL Data Manipulation, Definition and Control commands to create and query sample data. • Use of PL/SQL			
3	Software Development Life Cycle	• Demonstrate Software Development Life Cycle using program constructs. • Apply knowledge of Quality Assurance by quality Attributes, Software Metrics or Functional and Non-Functional Requirements. • Apply knowledge of Software Project planning, resource management, risk identification and risk mitigation to practical problems using agile methodologies.	5	5	10
4	Core Java	• Implementation of Object Oriented programming Concepts • Use and create packages and interfaces in a Java program • Use graphical user interface in Java programs : • Create Applets • Implement exception handling in Java • Implement multithreading • Use Input/output Streams for handling security implementations in Java	15	25	40

QUALIFICATION FILE

5	Foundations of Web Technologies	• Apply knowledge of Web servers, HTML5, Java script and jQuery for website designing. • Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services. • Learn and apply XML, create CSS • Create forms for web pages.	35	45	80
6	Enterprise Java	• Demonstrate Java Database connectivity using ODBC/JDBC. • Create static and dynamic web pages. • Demonstrate session management, session tracking using cookies / HTTP session and request handling for client/server side applications. • Create JSP pages for data movement between client and servlets. • Develop web applications using hibernate API. • MVC Architecture, EJB2/3 architecture, Handling Struts Validations. • Understanding life- cycle of Stateless Session Bean and Deployment of the same on Application Server using JSP client.	35	45	80
7	Management Development Program	• Good conversation skills • Writing effective emails /business letters • Acquire good communication skills/Interview skills /Mock Interview	30	-	30
8	Project	• Students will apply knowledge gained during	Grade		

		term I for project work. • Design, implement and evaluate computer technologies, systems, processes, components and/or programs appropriate to a defined task, while analyzing the impact on existing systems and potential future applications. • Think critically, relatively and analytically in technological solutions to simple and complex problems. • Apply formal frameworks, methods and management systems to the organization, storage and retrieval of data in ways that demonstrate an understanding of both the business enterprise and the relevant technology. • Implement effective business solutions across an organization that demonstrates appropriate consideration of alternative computer technologies, including networks, servers, programming languages and database systems. • Plan, analyze, design and construct information systems to identified specifications, using clear and efficient code in the relevant programming language(s). • Work effectively in a team to analyze the requirements of a complex software system, and solve problems by creating appropriate designs that satisfies these requirements Communicate to others the progress of the system	

		development and the content of the design by means of reports and presentations.			
Total Marks			150	150	300

Complete a grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

Title of NOS/Unit/Component:

Assessable outcomes	**Assessment criteria for the outcome**
Enter the learning outcomes /elements of competence which will be assessed.	List all the criteria applying to this element/outcome.
Certificate Course in Network Administration	**A+ >= 85%,** **A >= 70% to < 85%** **B >= 60% to < 70 %** **C >= 50% to < 60%** **D >= 40% to < 50%** **F < 40%**

Means of assessment 1

Theory portion Assessment will be done through LAN based online system. Paper will be Objective question based. Lab evaluation will be done under project evaluation.

Means of assessment 2

Re-examinations:

The following conditions will be applicable for the course end re-exam:

- Students who do not appear for an exam on the scheduled date will not have an automatic right to re-examination. Only those students who, in the opinion of the centre/course coordinator have a genuine reason for being absent may be allowed to appear for a re-exam.
- Students who have failed an exam may be allowed to appear for a re-exam.
- The re-exam should be conducted following the same process as the regular examination.
- Students, who failed/remained absent in the Course End Examination conducted by , shall be allowed to appear in the re-examination only once.
- Students who remain absent or fail in the re-examination will not get any further chance for appearing for the re-examination. In such case the candidate can receive the Performance Statement and the certificate of participation without any grade.
- On evaluation of their answer sheets 20% of the marks obtained by the students will be deducted (towards de-rating for re-examination) for arriving at the final score,

i.e. in order to clear the module test the student has to score a minimum of 48% marks instead of 40%. • There will be no re-exam for the re-exam
Pass/Fail: **If Candidate scored below 40% in any of the component like Theory, lab or Internal will be consider as FAIL.**

SECTION 2

SUMMARY EVIDENCE OF LEVEL

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
7	**Requires a command of wide-ranging specialised theoretical and practical skills, involving variable routine and non-routine contexts.**	**Wide-ranging factual and theoretical knowledge in broad contexts within a field of work or study.**	**Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work of study.**	**Good logical and mathematical skill understanding of social political and natural environment and organising information, communication and presentation skill.**	**Full responsibility for output of group and development**

Assessed outcome	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
1. Fundamentals of Computer & OOPs Concepts	Person may carry out a job as developer or tester. This job demands a command of wide-ranging specialised theoretical and practical skills, involving variable routine and non-routine contexts.	• Learning C, Data Structure concepts, Relational Database, Web Technologies and software engineering concepts will help learner to get employment as software	• Candidate can develop/ test software based on practical knowledge.	Candidate will be learning management Development Program and Organisational behaviour to communicate written and oral.	Candidate can perform well and responsible for output of group and development.
2. RDBMS					
3. Software Development Life Cycle					

QUALIFICATION FILE

Assessed outcome	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
4. Core Java		engineer, developer or tester or technical support.		Aptitude, basic understanding of social political and natural environment with good analytical and managerial skills	
5. Web Technologies					
6. Advanced Java					
7. Management Development Program					
8. Project					

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed? Set up the Advanced Computing Training School (ACTS) in 1993 to meet the ever-increasing skilled manpower requirements of the Information Communication Technologies (ICT) industry as well as supplement its intellectual resource base for cutting-edge research and development. Over the years has designed and delivered various postgraduate and undergraduate degree and diploma programmes. In addition, imparts ICT training to state and national governments and agencies, strategic sectors, corporate and industries, foreign countries and international students, based on specific requirements.
What is the estimated uptake of this qualification and what is the basis of this estimate? https://www.quora.com/What-is-the-scope-of-Java-in-the-present-and-future-of-the-computer-science-and-software-industry
What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF? **NA**

QUALIFICATION FILE

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

Effective course design begins with understanding who your students are, deciding what you want them to learn; determining how you will measure student learning; and planning activities, assignments and materials that support student learning.
Our courses are specialized and market driven.
There is a dedicated team in CDAC to design and develop courses. There is a set process of reviewing and updating the by taking feedback from industry and domain experts .We are in touch with more than 500 companies and we design and updated courses with their interventions as per market demand.

SECTION 4

EVIDENCE OF RECOGNITION AND PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

- This qualification has been designed in consultation with industry and domain expert keeping in mind today's need. Evaluation criteria have been added to ensure progression to related path ways identified as per career path.

Please attach any documents giving further information about any of the topics above.
Give details of the document(s) here:

1. Course Content

QUALIFICATION FILE

Course 1. Java Programming

Sl. No.	Module Name	Hours
1	Fundamentals of Computer & OOPs Concepts	26
2	Software Development Life Cycle	12
3	Database Technologies	30
4	Foundations of Web Technologies	32
5	Core Java	50
6	Enterprise Java	70
7	Management Development Program	60
8	Project	40
	Total	**320**

Fundamentals of Computer & OOPs Concepts (26 Hours)

- Fundamentals of Computers
- Uses of Computer, Hardware, Accessories,
- Interfaces and their functions, Computer hardware connectivity
- Primary and Secondary storage
- Input-output devices
- Software, types of software, Operating Systems
- Software used in Academic departments and other area.
- Operating System (Introduction, The Need of Operating System, Functions of Operating System User Interface)
- Integer representation and number conversion
- Linux Commands
- Fundamentals of Algorithms
- Mathematical Analysis for recursive and non recursive algorithm.
- Object Oriented concepts
- Classes and Objects
- Access Specifiers
- Overloading
- Inheritance
- Polymorphism

Software Development Life Cycle (12 Hours)

- Software Engineering
- Brief concept of Software Life Cycle Models
- Agile Techniques for software development
- Software Development Tools & Techniques
- Introduction to Coding Standards
- Software Testing

Database Technologies (30 Hours)

- Database Concepts
- Client/Server Computing
- RDBMS Technologies
- Codd's Rules
- Data Models
- Normalization Techniques
- ER Diagrams

QUALIFICATION FILE

- SQL and PL/SQL
- Overview of OORD (Oracle)
- Introduction SQL*Plus
- DDL, DML and DCL
- Tables, Indexes and Views
- Generic PL/SQL

Foundations of Web Technologies (32 Hours)

- HTML 5.0 programming
- Overview of Internet and Web Pages
- Introduction to HTML Tags
- Introduction to Web Browser / Composer
- Introduction to HTML Editor
- CSS Introduction
- CSS Syntax
- CSS Id & Class
- CSS How To
- CSS Styling
- CSS Box Model
- CSS Summary
- Java Scripting
- JS Introduction
- JS Statements
- JS Comments
- JS Variables
- JS Operators
- JS Comparisons
- JS Popup Boxes
- JS Functions
- JS Events
- JS Special Text
- JS Objects
- JS RegExp
- jQuery
- Introducing to jQuery
- Selecting the elements
- Bringing pages to life with jQuery
- JQuery Events
- Energizing pages with animations and effects
- DOM with jQuery utility functions
- The Purpose and Nature of XML
- XML Syntax and Structure rules
- XML Document Type Declaration
- XML and Data Binding XML linking mechanisms
- XML style language
- XML parsers

Core Java (50 Hours)

- Data Types, Operators and Language
- Constructs
- Inner Classes and Inheritance
- Interface and Package
- Exceptions

- Threads
- Java.lang
- Java.util
- Java.awt
- Java.io
- Java.applet
- Java.swing

Enterprise Java (70 Hours)

- Servlets, Java Server Pages
- Remote Method Invocation
- JDBC
- JavaBeans, Enterprise Java Beans
- Java Security
- Naming Services
- Java Mail
- Java Messaging Services
- Transactions
- Introduction to Struts Framework
- Introduction to hibernate, HQL
- J2EE (struts) and hibernate
- Introduction to JSF

Management Development Program

Introduction to communication, Barriers to communication, Kind of communication, Confidence building Non-verbal Communication, Fluency and vocabulary, Synonyms, Antonyms, Grammar, Noun Pronoun, Verb, Adjective, Preposition, Conjunction, Words of Idioms & phrases, Sentence Construction, Fill up the blanks, Pronunciation, Conversation practice, Polite Conversation, Greeting, Logical reasoning, General Aptitude, Writing: Covering letter, Resume, Email, Presentation Skill, group discussion, Interview skills, Mock interview